E3 Summer Training 2024

SCIENCE

Grade 6 Earth and Space Science

A Program of the A+ Education Partnership
In partnership with the Alabama State Dept. of Education

Grade 6
Earth and Space Science

Earth and Space Science content focuses on the disciplinary core ideas in the Earth and space sciences domain. The first core idea, "Earth's Place in the Universe," describes the universe as a whole and addresses its grand scale in both space and time. The second and third core ideas, "Earth's Systems: Materials and Processes" and "Earth's Systems: Energy and Weather," encompass the processes that produce Earth's continuously changing conditions. The fourth core idea, "Earth and Human Activity," addresses society's interactions with the planet.

Sixth grade students will develop and use models, analyze and interpret data, and construct explanations to gain a better understanding of Earth's systems and Earth's place in the universe. They will carry out investigations and utilize their findings as evidence in order to construct their own understanding of Earth. As they obtain, analyze, and utilize data, students are encouraged to develop solutions to conserve Earth's natural resources and limit the negative impact humans may have on the planet..

Embedded in the content standards are the disciplinary core ideas of the Engineering, Technology, and Applications of Science (ETS) domain, which require students to use design strategies in conjunction with knowledge and understanding of science and technology to solve practical problems. Engineering standards are denoted with a gear icon⚙. Through guided participation in the engineering design process, students will design solutions to mitigate real-world problems including the impact of severe weather and human activity on the environment.

Each content standard completes the stem *"**Students will**…"*

Earth's Place in the Universe		
Sun, Earth, and Moon	1. Manipulate models to demonstrate the patterns of motion of the sun, Earth, and moon.	**Patterns**
	a. Construct an evidence-based explanation of how the relative positions of the sun and Earth result in observable phenomena, including day and night cycles, length of year, and seasons.	**Cause and Effect**

	b. Construct an evidence-based explanation of how the relative positions of the sun, moon, and Earth result in observable phenomena, including lunar cycles, eclipses, and tidal cycles.	**Cause and Effect**
The Solar System and the Universe	2. Evaluate information to compare and contrast past and current views about the structure of the universe and show how these views have changed over time. *Example: structure of the solar system (heliocentric vs. geocentric)*	**Patterns**
	3. Construct an evidence-based explanation of the role of gravity on the movement of natural and manmade objects within galaxies and the solar system. *Examples: planets, moons, comets, asteroids, meteors, satellites*	**Systems and System Models**
	4. Analyze and use data to determine scale properties and characteristics of objects in the solar system including sizes, distances, orbital periods, basic composition, and ability to support life.	**Scale, Proportion, and Quantity**
Earth's Systems: Materials and Processes		
Earth's Processes	5. Obtain, evaluate, and communicate evidence that explains how constructive and destructive processes shape Earth's surface. a. Develop and use models to demonstrate the processes that form rocks and cycle Earth's materials. *Examples: crystallization, heating and cooling, weathering and erosion* b. Construct an evidence-based explanation of how rocks are classified as metamorphic, igneous, or sedimentary based on their characteristics and the process of the rock cycle. c. Develop and use models to demonstrate types of weathering, effects of agents of erosion and transportation, and the formation of environments of deposition.	**Cause and Effect**

	Examples: physical and chemical weathering; water, wind, ice, and vegetation; deltas, alluvial fans, sand dunes d. Use research-based evidence to propose a scientific explanation of how the distribution of Earth's resources, including minerals, fossil fuels, and groundwater, results from ongoing geoscience processes.	
Plate Tectonics	6. Construct an evidence-based explanation of how tectonic plate movement impacts Earth's surface over geological time. *Examples: formation of canyons, caverns, volcanic island chains* a. Construct an evidence-based explanation of how Earth's internal energy flows between its surface and its interior. *Examples: transfer of heat from the core to crust; convection currents due to differences in density* b. Construct a scientific explanation of how the movement of lithospheric plates can cause major geologic events and form Earth's surface features, including convergent, divergent, and transform boundaries; earthquakes; and volcanoes. c. Provide evidence of past plate movements, using data regarding the distribution of fossils, rocks, continental shapes, and seafloor structures.	**Energy and Matter**
	7. Analyze data from rock strata and the fossil record to construct a chronology of occurrences in Earth's history. *Examples:fossil evidence, sedimentary rock layers, impact craters, and volcanic eruptions*	
Earth's Systems: Energy and Weather		
Energy Transfer	8. Construct an evidence-based explanation of how the sun's energy drives the motion and cycling of water through the hydrosphere.	**Systems and System Models**

	a. Plan and carry out an investigation to determine the differences in rates of energy transfer from the sun to air, to land, and to water via conduction, convection, and radiation. b. Develop and use a model that illustrates how differences in heat and pressure affect density and the relationship between density and convection.	
Weather	9. Use data analysis to monitor and predict weather changes and the impact of weather events, including severe weather. *Example: Track and analyze temperature and barometric pressure data collected for the local area to identify trends that result in weather changes, and use this analysis to predict future weather events in the area.* a. Obtain, evaluate, and communicate data that describes characteristics of air masses, including temperature, pressure, and humidity. *Examples: weather maps, diagrams, radar and computer simulations* b. Construct an explanation of how air pressure, weather fronts, and air masses are related to weather events. c. ⚙Design solutions to mitigate the impact of severe weather. *Examples: storm shelter, action plan, weather monitoring tools*	**Stability and Change**
Climate	10. Use observations and data from investigations to demonstrate how the sun, air, land, and water affect Earth's climate. *Examples: simulations of convection in the atmosphere and ocean, comparisons of how soil and water absorb heat* a. Develop models demonstrating how unequal heating and the rotation of the Earth cause local and global wind systems and oceanic currents. b. Construct explanations of how the tilt and curvature of the Earth cause unequal heating of its surface, resulting in regional climates based on patterns of latitude. c. Construct an explanation of how altitude, geothermal activity, and oceanic distribution of heat produce typical regional climate patterns. *Examples: mountains, geothermal features in Iceland, California currents*	**Patterns**

Earth and Human Activity		
Human Impact	11. Obtain, evaluate, and communicate information concerning the relationships between human activities and natural processes and how those relationships affect Earth's systems, including human population growth and its impact on the global environment over time. a. ⚙Define problems and design solutions to monitor and mitigate human impact on the environment. *Examples: water usage (removal of water from streams and aquifers or construction of dams and levees), land usage (urban development, agriculture, wetlands), pollution of air, water, and land*	**Cause and Effect**

GRADE 6 EARTH AND SPACE SCIENCE

Course Overview

1ST 9-WEEKS
Nature of Science Unit 1: Earth's Materials

2ND 9-WEEKS
Unit 2: Plate Motion Unit 3: Geologic Time

3RD 9-WEEKS
Unit 4: Energy and Earth's Cycles Unit 5: Weather and Climate Unit 6: Human Impact on Earth (Note-- The content of this unit may be incorporated into units 2-5)

4TH 9-WEEKS
Unit 7: Interaction of the Sun-Earth-Moon System Unit 8: Celestial Bodies and the Universe

GRADE 6 EARTH AND SPACE SCIENCE

Course Overview

STANDARDS CROSSWALK This table matches the 2023 standards to the current Grade 6 Earth and Space Science curriculum.				
ALCOS	**1ST 9-WEEKS**	**2ND 9-WEEKS**	**3RD 9-WEEKS**	**4TH 9-WEEKS**
1				X
2	Not met			
3				X
4				X
5	X			
6		X		
7		X		
8			X	
9			X	
10			X	
11		X	X	

Grade 6 Earth and Space Science

Scope and Sequence 1st 9-Weeks

Nature of Science	UNIT 1: Earth Materials

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	Lesson 1- Lab Safety	Lesson 2- Lab Equipment and Tools	Lesson 3- Measurement	Measurement continued	Lesson 4- Scientific Investigation
WEEK 2	Scientific Investigation continued	Scientific Investigation continued	Scientific Investigation continued	Scientific Investigation continued	Scientific Investigation continued
WEEK 3	Flex day	Lesson 1- Minerals	Minerals continued	Minerals continued	Minerals continued
WEEK 4	Minerals continued	Minerals continued	Minerals continued	Lesson 2- Rocks	Rocks continued
WEEK 5	Rocks continued	Rocks continued	Lesson 3- The Rock Cycle	The Rock Cycle continued	Lesson 4- Weathering, Erosion and Deposition
WEEK 6	Weathering, Erosion and Deposition continued	Weathering, Erosion and Deposition continued	Weathering, Erosion and Deposition continued	Weathering, Erosion and Deposition continued	Weathering, Erosion and Deposition continued
WEEK 7	Weathering, Erosion and Deposition continued	Weathering, Erosion and Deposition continued	Lesson 5- Natural Resources	Natural Resources continued	Natural Resources continued
WEEK 8	Open for flexibility in schedule				
WEEK 9	Open for flexibility in schedule				

Grade 6 Earth and Space Science

Nature of Science Overview

Nature of Science	RECOMMENDED TIME FRAME: 2 weeks

UNIT OVERVIEW

Accurately conveying the nature of science is common to most science education curricula worldwide. There is a clear message that understanding the nature of science is crucial for effective science teaching, for valuable science learning, and for responsible participation in society. The A+ College Ready curriculum clearly and strongly emphasizes the importance of the nature of science by placing it as the introductory unit to science. Each of the skills in this unit may not be mastered in this time frame but should be practiced and reinforced throughout the course.

STANDARDS

NGSS Science Practices

- ✓ Obtaining, Evaluating, and Communicating Information
- ✓ Analyzing and Interpreting Data
- ✓ Engaging in Argument from Evidence
- ✓ Asking Questions
- ✓ Constructing Explanations
- ✓ Planning and Conducting Investigations
- ✓ Using Mathematics and Computational Thinking

RESOURCES

Learning Plans
Student Progress Monitoring Document
Student Notes and PowerPoints
Labs/Activities
Checkpoint Questions

Grade 6 Earth and Space Science

Unit 1 Overview

Earth Materials	RECOMMENDED TIME FRAME: 5 weeks

UNIT OVERVIEW

Students will develop an understanding of the following.

- how materials and energy flow and cycle through the Earth.
- minerals and rocks are foundational components of the Earth's structure.
- how weathering, erosion, and deposition changes minerals and rocks over time to form the many feathers that shape our planet.

Students will also investigate natural resources, discerning between renewable and nonrenewable resources, and examine the impact that humans have on the environment.

STANDARDS

6.ESS.5 Use evidence to explain how different geologic processes shape Earth's history over widely varying scales of space and time (e.g. chemical and physical erosion; volcanic eruptions; regional geographical features, including Rickwood Caverns).

6.ESS.8 Plan and carry out investigations that demonstrate the chemical and physical processes that form rocks and cycle Earth materials (e.g., processes of crystallization, heating and cooling, weathering, deformation, and sedimentation).

6.ESS.10 Use research-based evidence to propose a scientific explanation regarding how the distribution of Earth's resources such as minerals, fossil fuels, and groundwater are the result of ongoing geoscience processes (e.g., past volcanic and hydrothermal activity, burial of organic sediments, active weathering of rock).

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Constructing Explanations ✓ Planning and Carrying Out Investigations	✓ Earth's Systems ✓ Earth and Human Activity	✓ Scale, Proportion, and Quantity ✓ Energy and Matter ✓ Cause and Effect

RESOURCES

Learning Plans
Student Progress Monitoring Document
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Grade 6 Earth and Space Science

Scope and Sequence 2nd 9-Weeks

UNIT 2: Plate Motion	UNIT 3: Geologic Time

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	Lesson 1- Earth's Interior Structure	Earth's Interior Structure continued	Lesson 2- Convection Inside the Earth	Convection Inside the Earth continued	Convection Inside the Earth continued
WEEK 2	Convection Inside the Earth continued	Lesson 3- Continental Drift	Continental Drift continued	Continental Drift continued	Continental Drift continued
WEEK 3	Lesson 4- The Theory of Plate Tectonics	The Theory of Plate Tectonics continued	The Theory of Plate Tectonics continued	Lesson 5- Earthquakes	Earthquakes continued
WEEK 4	Earthquakes continued	Earthquakes continued	Earthquakes continued	Earthquakes continued	Earthquakes continued
WEEK 5	Earthquakes continued	Earthquakes continued	Earthquakes continued	Earthquakes continued	Earthquakes continued
WEEK 6	Earthquakes continued	Earthquakes continued	Lesson 6- Volcanoes	Volcanoes continued	Volcanoes continued
WEEK 7	Volcanoes continued	Volcanoes continued	Volcanoes continued	Volcanoes continued	Volcanoes continued
WEEK 8	Lesson 1- Fossils	Fossils continued	Lesson 2- Dating Rocks	Dating Rocks continued	Lesson 3- Geologic Time Scale
WEEK 9	Geologic Time Scale continued	Geologic Time Scale continued			

Grade 6 Earth and Space Science

Unit 2 Overview

Plate Motion	RECOMMENDED TIME FRAME: 7 weeks

UNIT OVERVIEW

Students will begin this unit by studying Earth's interior structure to learn how movements deep within Earth are accountable for creating surface features. Once students understand Earth's interior, a variety of hands-on activities, simulations, and models will be used to help students comprehend how these deep-Earth movements impact our lives on Earth's surface.

STANDARDS

6.ESS.4 Construct explanations from geologic evidence (e.g., field evidence or representations, including models of geologic cross-sections; sedimentary layering) to identify patterns of Earth's major historical events (e.g., significant volcanic eruptions, fossilization, folding, faulting, igneous intrusion, erosion).

6.ESS.5 Use evidence to explain how different geologic processes shape Earth's history over widely varying scales of space and time (e.g. chemical and physical erosion; volcanic eruptions; regional geographical features, including Rickwood Caverns).

6.ESS.6 Provide evidence from data of the distribution of fossils and rocks, continental shapes, and seafloor structures to explain past plate motions.

6.ESS.9 Use models to explain how the flow of Earth's internal energy drives a cycling of matter between Earth's surface and deep interior causing plate movements (e.g., mid-ocean ridges, ocean trenches, volcanoes, earthquakes, mountains, rift valleys, volcanic islands).

6.ESS.11 Use models to illustrate the resulting magnetic field (e.g., magnetic poles) and to explain its measurable effects.

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Constructing Explanations ✓ Developing and Using Models	✓ Earth's Systems	✓ Patterns ✓ Scale, Proportion, and Quantity ✓ Energy and Matter ✓ Cause and Effect

RESOURCES

Learning Plans
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Grade 6 Earth and Space Science

Unit 3 Overview

Geologic Time	RECOMMENDED TIME FRAME: 1-2 Weeks

UNIT OVERVIEW

In this unit, students will gain an understanding of how geologists have formed a timeline of Earth's history through studying fossil and rock layers.

STANDARDS

6.ESS.4 Construct explanations from geologic evidence (e.g., field evidence or representations, including models of geologic cross-sections; sedimentary layering) to identify patterns of Earth's major historical events (e.g., significant volcanic eruptions, fossilization, folding, faulting, igneous intrusion, erosion).

6.ESS.5 Use evidence to explain how different geologic processes shape Earth's history over widely varying scales of space and time (e.g. chemical and physical erosion; volcanic eruptions; regional geographical features, including Rickwood Caverns)

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Constructing Explanations	✓ Earth's Systems	✓ Patterns ✓ Scale, Proportion, and Quantity

RESOURCES

Learning Plans
Student Progress Monitoring Document
Student Notes and PowerPoints
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Checkpoint Questions

Grade 6 Earth and Space Science

Scope and Sequence 3rd 9-Weeks

UNIT 4: Energy and Earth's Cycles	UNIT 5: Weather and Climate	UNIT 6: Human Impact on Earth

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	Lesson 1- Solar Energy	Solar Energy continued	Lesson 2- The Water Cycle	The Water Cycle continued	The Water Cycle continued
WEEK 2	The Water Cycle continued	The Water Cycle continued	The Water Cycle continued	Lesson 3- The Nitrogen Cycle	The Nitrogen Cycle continued
WEEK 3	Lesson 4- The Carbon Cycle	The Carbon Cycle continued	The Carbon Cycle continued	The Carbon Cycle continued	The Carbon Cycle continued
WEEK 4	Lesson 1- Solar Energy from the Sun to Earth	Solar Energy from the Sun to Earth continued	Lesson 2- How Earth Heats and Cools	How Earth Heats and Cools continued	Lesson 3- Atmosphere: Earth's Blanket of Air
WEEK 5	Atmosphere: Earth's Blanket of Air continued	Lesson 4- Convection: The Movement of Air and Water	Convection: The Movement of Air and Water continued	Convection: The Movement of Air and Water continued	Lesson 5- Air Masses and Fronts
WEEK 6	Air Masses and Fronts continued	Lesson 6- Water Cycle and Weather	Lesson 7- Monitoring Weather with Instruments	Monitoring Weather with Instruments continued	Lesson 8- Weather Maps and Meteorology
WEEK 7	Weather Maps and Meteorology continued	Weather Maps and Meteorology continued	Weather Maps and Meteorology continued	Lesson 9- Natural Disasters	Natural Disasters continued
WEEK 8	Lesson 1- Human Influence on Earth's Cycles	Human Influence on Earth's Cycles continued	Human Influence on Earth's Cycles continued	Human Influence on Earth's Cycles continued	Lesson 2- Effects of Human Activity
WEEK 9	Effects of Human Activity continued	Effects of Human Activity continued	Effects of Human Activity continued	Lesson 3- Depletion of Resources	Depletion of Resources continued

Grade 6 Earth and Space Science

Unit 4 Overview

Energy and Earth's Cycles	RECOMMENDED TIME FRAME: 3 weeks

UNIT OVERVIEW

In this unit students will use models to explain how solar energy drives the various dynamic cycles of the Earth including the water cycle, the nitrogen cycle, and the carbon cycle.

STANDARDS

6.ESS.7 Use models to construct explanations of the various biogeochemical cycles of Earth (e.g., water, carbon, nitrogen) and the flow of energy that drives these processes.

6.ESS.16 Implement scientific principles to design processes for monitoring and minimizing human impact on the environment (e.g., water usage, including withdrawal of water from streams and aquifers or construction of dams and levees; land usage, including urban development, agriculture, or removal of wetlands; pollution of air, water, and land).

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Developing and Using Models ✓ Constructing Explanations and Designing Solutions	✓ Earth's Systems ✓ Earth and Human Activity	✓ Stability and Change ✓ Cause and Effect

RESOURCES

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Grade 6 Earth and Space Science

Unit 5 Overview

Weather and Climate	RECOMMENDED TIME FRAME: 4-5 weeks

UNIT OVERVIEW

Weather is a natural and somewhat predictable condition that drives our daily activities. The moment you wake up in the morning weather determines your clothes selection and activities for the day. Climate, on the other hand, is a predictable condition based on previous years' temperatures and moisture conditions for a region. If you have taken a trip for more than a week to a location you depend on the climate conditions compared to weather conditions. Living in Alabama you know that summer is hot and humid because you live here, but you do not know the weather each day during the summer. Weather and climate begins with solar energy from the sun heating Earth's surfaces at different rates. This difference between heating and cooling of Earth is responsible for wind, the water cycle, and movement of weather around Earth within Earth's atmosphere. Meteorologists use a variety of instruments to monitor and predict weather, especially catastrophic events such as tornadoes and hurricanes which form from thunderstorms.

Unit 5 engages students in 5E lessons and lab activities to gain an understanding of how weather and climate are the result of various conditions in Earth's atmosphere.

STANDARDS

6.ESS.12 Integrate qualitative scientific and technical information (e.g., weather maps; diagrams; other visualizations, including radar and computer simulations) to support the claim that motions and complex interactions of air masses result in changes in weather conditions.

a. Use various instruments (e.g., thermometers, barometers, anemometers, wet bulbs) to monitor local weather and examine weather patterns to predict various weather events, especially the impact of severe weather (e.g., fronts, hurricanes, tornadoes, blizzards, ice storms, droughts).

6.ESS.13 Use models (e.g., diagrams, maps, globes, digital representations) to explain how the rotation of Earth and unequal heating of its surface create patterns of atmospheric and oceanic circulation that determine regional climates.

a. Use experiments to investigate how energy from the sun is distributed between Earth's surface and its atmosphere by convection and radiation (e.g., warmer water in a pan rising as cooler water sinks, warming one's hands by a campfire).

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Obtaining, Evaluating, and Communicating Information ✓ Analyzing and Interpreting Data ✓ Developing and Using Models	✓ Earth's Systems	✓ Patterns ✓ Cause and Effect ✓ Systems and System Models

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Grade 6 Earth and Space Science

Unit 6 Overview

Human Impact on Earth	RECOMMENDED TIME FRAME: 2 weeks

UNIT OVERVIEW

This unit is designed to be a standalone unit, but it is recommended that the topics (and associated activities) are incorporated into units 2-5 as you teach about Earth's cycles and Weather and Climate.

Human Impact on Earth has become a hot topic over the past twenty years. Over the past 15 years Earth has experienced 12 of its hottest years on record. It has become evident that human activity is affecting our water, frozen water (ice), atmosphere, and land. In the past few years our temperatures have risen, water levels are increasing worldwide, an increase of ice melt with glaciers, and an increase in carbon dioxide/other harmful gasses in our atmosphere. As the human population continues to increase worldwide and the demand for food, water, and energy grows the depletion of our natural resources are becoming strained. Humans are using fossil fuels and minerals at an alarming rate increasing pollution and greenhouse gases worldwide contributing to the greenhouse effect. There has been a green movement in the past few years to decrease the amount of pollution and dependence on non-renewable resources while increasing the use of renewable resources, creating regulations to limit pollution, and educating the public about their carbon footprint.

STANDARDS

6.ESS.14 Analyze and interpret data (e.g., tables, graphs, maps of global and regional temperatures; atmospheric levels of gasses such as carbon dioxide and methane; rates of human activities) to describe how various human activities (e.g., use of fossil fuels, creation of urban heat islands, agricultural practices) and natural processes (e.g., solar radiation, greenhouse effect, volcanic activity) may cause changes in local and global temperatures over time.

6.ESS.15 Analyze evidence (e.g., databases on human populations, rates of consumption of food and other natural resources) to explain how changes in human population, per capita consumption of natural resources, and other human activities (e.g., land use, resource development, water and air pollution, urbanization) affect Earth's systems.

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Analyzing and Interpreting Data	✓ Earth's Systems ✓ Earth and Human Activity	✓ Stability and Change ✓ Cause and Effect

RESOURCES

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Grade 6 Earth and Space Science

Scope and Sequence 4th 9-Weeks

UNIT 7: Interaction of the Sun-Earth-Moon System	UNIT 8: Celestial Bodies and the Universe

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	Lesson 1- Introduction to the Sun- Earth-Moon System	Introduction to the Sun- Earth-Moon System continued	Introduction to the Sun- Earth-Moon System continued	Lesson 2- Rotation vs. Revolution	Rotation vs. Revolution continued
WEEK 2	Rotation vs. Revolution continued	Lesson 3- Tracking Shadows	Lesson 4- Investigating the Cause of Seasons	Investigating the Cause of Seasons continued	Investigating the Cause of Seasons continued
WEEK 3	Lesson 5- Investigating Lunar Phases	Investigating Lunar Phases continued	Investigating Lunar Phases continued	Investigating Lunar Phases continued	Lesson 6- Solar and Lunar Eclipses
WEEK 4	Solar and Lunar Eclipses continued	Solar and Lunar Eclipses continued	Lesson 7- What Causes Tides	What Causes Tides continued	What Causes Tides continued
WEEK 5	Lesson 1- Expanding Universe and the Big Bang Theory	Expanding Universe and the Big Bang Theory continued	Expanding Universe and the Big Bang Theory continued	Lesson 2- Life Cycle of a Star	Life Cycle of a Star continued
WEEK 6	Life Cycle of a Star continued	Life Cycle of a Star continued	Lesson 3- H-R Diagram	H-R Diagram continued	H-R Diagram continued
WEEK 7	Lesson 4- Star Systems and Galaxies	Star Systems and Galaxies continued	Lesson 5- Gravity, Inertia, Motion, Mass and Weight	Gravity, Inertia, Motion, Mass and Weight continued	Gravity, Inertia, Motion, Mass and Weight continued
WEEK 8	Lesson 6- Comets, Asteroids and Meteors	Comets, Asteroids and Meteors continued	Comets, Asteroids and Meteors continued	Lesson 7- Solar System: Inner and Outer Planets	Solar System: Inner and Outer Planets continued
WEEK 9	Lesson 8-Solar System: Scale and Models	Solar System: Scale and Models continued	Solar System: Scale and Models continued	Solar System: Scale and Models continued	Solar System: Scale and Models continued

Grade 6 Earth and Space Science

Unit 7 Overview

Interaction of the Sun-Earth-Moon System	RECOMMENDED TIME FRAME: 4 weeks

UNIT OVERVIEW

The Interaction of the Sun-Earth-Moon system is responsible for day and night, our calendar year, seasons, tides, eclipses, and lunar phases. As all three celestial bodies interact together, many patterns form from their cause-and-effect relationships. The relationship between the Sun, Earth, and Moon becomes more evident as we examine their movements, positions, and the force they exert on each other. Students begin this unit by comparing and contrasting the Sun, Earth and Moon and discovering how the Sun and Earth interact to create day and night.

In this unit, students will utilize hands-on activities, simulations, models, and articles to help students explain how the sun, Earth, and moon affect one another.

STANDARDS

6.ESS.1 Create and manipulate models (e.g., physical, graphical, conceptual) to explain the occurrences of day/night cycles, length of year, seasons, tides, eclipses, and lunar phases based on patterns of the observed motions of celestial bodies.

6.ESS.3 Develop and use models to determine scale properties of objects in the solar system (e.g., scale model representing sizes and distances of the sun, Earth, moon system based on a one-meter diameter sun).

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Developing and Using Models	✓ Earth's Place in the Universe	✓ Patterns ✓ Scale, Proportion, and Quantity ✓ Systems and System Models

RESOURCES

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Grade 6 Earth and Space Science

Unit 8 Overview

Celestial Bodies and the Universe	RECOMMENDED TIME FRAME: 4 weeks

UNIT OVERVIEW

The Universe is made of many celestial objects separated by vast distances. Unit 8 begins with understanding how the universe came to exist with a focus on singularity, the big bang, and the rapid expansion of the universe. The ejected material from the big bang created the ingredients for stars to form. Life Cycles of stars is discussed exploring how Hydrogen and Helium and the force of gravity develop stars from nebula to a star and its eventual death as a black dwarf, neutron star or black hole. The H-R diagram is used to classify stars based on their luminosity, size, and temperature comparing stars in and out of the main sequence. Galaxies followed the formation of stars as groups of stars formed clusters and different types of galaxies like spiral, elliptical, irregular, and peculiar. Our Milky Way galaxy is a spiral galaxy and one of billions of galaxies in the universe. Within our galaxy is our solar system which is governed by the Sun with its strong gravitational force holding all the planets, asteroids, and comets in orbit around it. Finally, the formation of Earth and other terrestrial planets closest to the Sun and Jovian giants located farthest from the Sun. Throughout the unit students will engage with several hands-on activities, simulations, models, and articles to investigate the expanding universe and the celestial bodies that it is composed of, examine the role that gravity plays in the shaping of galaxies, describe the formation of black holes, and describe orbital patterns of bodies within the solar system.

STANDARDS

6.ESS.2 Construct models and use simulations (e.g., diagrams of the relationship between Earth and man-made satellites, rocket launch, International Space Station, elliptical orbits, black holes, life cycles of stars, orbital periods of objects within the solar system, astronomical units and light years) to explain the role of gravity in affecting the motions of celestial bodies (e.g., planets, moons, comets, asteroids, meteors) within galaxies and the solar system.

6.ESS.3 Develop and use models to determine scale properties of objects in the solar system (e.g., scale model representing sizes and distances of the sun, Earth, moon system based on a one-meter diameter sun).

PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
✓ Developing and Using Models ✓ Using Mathematics and Computational Thinking	✓ Earth's Place in the Universe	✓ Systems and System Models ✓ Scale, Proportion, and Quantity

RESOURCES

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